

P.C.P.B. #1

September 3, 1950 (1)

TELECOMMUNICATIONS PROBLEMS  
CONFRONTING THE UNITED STATES

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AN EXPOSITION OF THE TELECOMMUNICATIONS PROBLEMS  
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I

The President's Communications Policy Board, created by Executive Order #10110 of February 17, 1950, has evolved the following exposition of telecommunications problems which confront the United States. The relative importance of the problems outlined in this exposition is not necessarily expressed by the numerical sequence of their listing. In this connection, it should be noted that the consideration of Problem No. 5, which is the most important and far-reaching of all of the Problems stated, will, by its very nature, be affected by the research and findings in connection with all of the other items contained in the exposition.

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The exposition has been compiled upon a basis of reports, legislation, treaties, opinions, U. S. telecommunications agency expressions, and the language of the Executive Order #10110, which created this Board. For the purposes of ready reference, pertinent excerpts of that Order are quoted.

President's Statement of the Importance of Communications

"Communications services represent a vital resource in our modern society. They make possible the smooth functioning of our complex economy; they can assist in promoting international understanding and good will; they constitute an important requirement for our national security. There is, accordingly, a major public interest in assuring the adequacy and efficiency of these services." \* \* \* \* (Quoted from the President's letter to the Chairman of the Board.)

Terms of Reference

\* \* \* \* "It shall be the function of the Board to study the present and potential use of radio and wire communications facilities by governmental and non-governmental agencies and to make and present to the President evaluations and recommendations in the national interest concerning (a) policies for the most effective use of radio frequencies by governmental and non-governmental users and alternative administrative arrangements in the Federal Government for the sound effectuation of such policies, (b) policies with respect to the international radio and wire communications, (c) the relationship of Government communications to non-government communications, and (d) such related policy matters as the Board may determine." \* \* \* \* (Quoted from the Executive Order #10110 of February 17, 1950, creating the Board.)

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DEFINITIONSOF WORDS AND PHRASES APPEARING HEREIN

DEFINITIONS

1. Harmful Interference - as used herein, means that reception of a radio transmission is curtailed by interference, to a degree that reduces efficiency of service.
2. Frequency (or Channel) - as used herein, refers to a relatively small, but specific, part of the radio spectrum. A frequency normally is identified by the actual center point (in kilocycles) in the total width embraced by the transmission of energy.
3. Frequency Assignment - as used herein, means the designation of a discrete frequency for transmission purposes by a specific radio station or circuit.
4. Frequency Allocation - as used herein, means the apportionment of an appreciable part of the spectrum to a particular Service, usually upon an exclusive basis.
5. Band (or Frequency Band) - as used herein, refers to a relatively large part of the radio spectrum. The term is used to indicate the particular part of the spectrum under consideration, such as, "The high-frequency bands," "the 7 Mc band," etc.
6. Bandwidth (or Channel Width) - as used herein, is the number of kilocycles, (or cycles), stated, when it is desired to express the amount of spectrum encompassed by a transmission of energy.  
  
Note: The terms "Band" and "Bandwidth" are often loosely employed, with confusing results.
7. National Interest - when used alone herein, is considered to include National Security and Economy.
8. Policy - is not used herein in its lesser applications. It refers throughout to a line of governing action.
9. Formalized Radio Services - as used herein, refers to those Services which have been dignified with exclusive rights in the radio spectrum, by the Atlantic City Table of Allocations. These Services are: Fixed, Maritime, Aeronautical, Amateur, Broadcasting, and Land Mobile.
10. Functionalized Radio Facilities or Services - as used herein, refers to a service or facility within a Service which performs a specific function, such as Safety, Navigational, Public Correspondence, etc.

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Specific Problems and Aspects of Telecommunications  
Under Consideration in This Exposition

A. Specific problems:

1. The Increasing Demand for Frequency Assignments Within the Limitations of the Usable Radio Spectrum.
2. Effectiveness of Administration of the Radio Spectrum by the United States.
3. Unsound Conditions in the Domestic Commercial Telegraph Industry.
4. The Effectiveness of the FCC in Coping With Its Increased Workload.
5. The Necessity for Formulating and Implementing a National Telecommunications Policy.

B. Aspects of Telecommunications which should be explored and translated in terms of the overall national interest.

6. Merger of Commercial Overseas Communication Companies in Terms of Overall National Interest.
7. The Extent to Which the Government Should Continue Operation of Communication Facilities.
8. A Review of United States Telecommunications from the Standpoint of Monopoly.

IV

Specific Objective

A. The formulation of a Total National Communications Policy to include:

1. Policy for the most effective use of radio frequencies by governmental and non-governmental users.

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2. Policy with respect to national radio and wire communications.
  3. Policy with respect to relationship of government communications to non-government communications.
  4. Such additional related policy matters as may be pertinent.
- B. Administrative arrangements in the Federal Government for the sound formulation and continuing effectuation of the policies in A.

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Interests and Activities of the United States  
Falling Within the Scope of This Exposition

A. Interests

1. National Security
2. National Economy
3. Foreign Relations
4. Government Administration
5. Civil Defense
6. Entertainment
7. Public Enlightenment
8. Culture and Education
9. Health and Safety

B. Direct Activities

1. Telephone Communications Industry
2. Telegraph Communications Industry
3. Research and Development
4. Government Communication Services
  - (a) Military
  - (b) Non-military

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5. Radio Broadcasting and Television
6. Medical, Scientific and Industrial
7. Radio Manufacturing

C. Related Activities

1. The Postal Services
2. Railroad Transportation
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4. Maritime Transportation
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- C. Statement and Testimony
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1. INCREASING DEMAND FOR FREQUENCY ASSIGNMENTS WITHIN THE USABLE RADIO SPECTRUM.

1.1 Introduction

1.11 The Growth and Development of Radio Facilities and Services.

1.111 Description of the radio spectrum as a natural resource.

1.112 Contribution of research, development, and application to expanding usable spectrum.

1.113 The impetus of world unrest and global wars upon the growth and development of radio facilities and services.

1.114 The contribution of radio to the national interest.

1.1141 National security.

1.1142 Activities concerned.

1.1143 Contribution in dollars to national product.

1.1144 Measure of total U. S. activity in measurable units, such as calls, messages, or work. ( )

1.12 Growth of Functional Radio Facilities and Services.

1.121 Safety of life and property.

1.122 Services developed for public interest, convenience, and necessity, such as broadcasting, common carrier, etc.

1.123 As an instrument in research, development, and experimentation.

1.13 The Evolution of Formalized Radio Services.

1.131 Reasons for formalization of particular services to specific parts of spectrum.

1.132 Avoidance of interference, provision for sufficient national and international use, and provision for future expansion of services, existing and to be developed.

1.133 The formalized structure of these services and how they work.

1.1331 Formalization of services as an aid to administration, regulation, use, and control, nationally and internationally.

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1.14 The Necessity for International Coordination and Control.

1.141 Factors requiring coordination.

1.1411 Propagation, technical, and operational.

1.142 Mechanisms for international coordination.

1.1421 International Telecommunications Union, and its organs.

1.15 Competition for Use of the Radio Spectrum.

1.151 Domestic competition between broad user categories.

1.1511 As between government and non-government users.

1.1512 As between military and non-military government users.

1.1513 As between government users.

1.1514 As between military users.

1.1515 As between non-government users.

1.152 Domestic competition between various media.

1.1521 As between radio and wire.

1.1522 As between radio and cable.

1.1523 As between rapid communication and transport services.

1.15231 Air.

1.15232 Railroad.

1.15233 Ship.

1.15234 Bus and truck.

1.15235 Postal service.



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- 1.153 Domestic competition within and between formal radio services.
  - 1.1531 Fixed service.
  - 1.1532 Maritime services.
  - 1.1533 Aeronautical services.
  - 1.1534 Broadcasting services.
  - 1.1535 Amateur service.
  - 1.1536 Land mobile services.
- 1.154 Domestic competition within and between functionalized services.
  - 1.1541 Safety of life and property.
  - 1.1542 National security.
  - 1.1543 Administration of government.
  - 1.1544 Public welfare.
  - 1.1545 Entertainment.
  - 1.1546 Dissemination of information - public enlightenment - the press.
  - 1.1547 Aid to economic activities.
  - 1.1548 Research, development, and experimentation.
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  - 1.1551 Low frequency.
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  - 1.1562 Urban.
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  - 1.1572 At Cairo.
  - 1.1573 At Atlantic City.
    - 1.15731 The "haves" and the have-nots."
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  - 1.1574 The P.F.B. and the I.F.R.B.
  - 1.1575 The WPFBLC.
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1.2 An Analysis of Spectrum Possibilities Today - The Supply of Channels.

## 1.21 The significance of a radio channel.

1.211 Definition of a channel in terms of frequency or wavelength.

1.212 Characteristics.

## 1.22 Theoretical channeling possibilities of the usable radio spectrum.

1.221 The usable radio spectrum.

1.222 Propagational characteristics of different portions of the spectrum.

1.223 Bandwidth of intelligence to be transmitted.

1.224 Sharing.

1.2241 Time sharing.

1.2242 Geographical sharing.

1.225 Variables and anomalies of propagation.

1.226 Limits to national and international regulation and control in the assignment and use of the spectrum.

## 1.23 Factors militating against achieving theoretical possibilities.

1.231 Technical.

1.2311 Equipment imperfections.

1.2312 Propagational variables.

1.232 Operational.

1.2321 Inadequate systematization.

1.2322 Effects of mobile transmitting and/or receiving radio stations.

1.2323 Imposed restrictions, (regulatory, etc.)

## 1.233 Economic.

1.2331 Increasing cost of equipment to achieve theoretical ideal.

1.2332 Resistance to writing off obsolete equipment.

1.2333 Costs of training personnel in new techniques and practices.

## 1.234 Political.

1.2341 Opposing world forces.

1.2342 The "have" and "have-not" (countries) repeated conflict.

## 1.235 National defense.

1.2351 Reluctance to effect transitional modernization.

1.2352 The restraints imposed by security requirements.

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1.2362 Variations in and inadequacies of standards of administration, regulation, and control of radio spectrum by cognizant agencies.

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## 1.24 Determinants of channel widths.

1.241 Performance of existing equipment.

1.242 Influence of improved equipment not yet in general service.

## 1.25 The resultant supply of radio channels.

1.251 Below 30 kc (VLF).

1.252 30-300 kc (LF).

1.253 300-3000 kc (MF).

1.254 3000-30,000 kc (HF).

1.255 30-300 Mc (VHF).

1.256 300-3000 Mc (UHF).

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1.3 An Analysis of Spectrum Utilization Today - The Demand for Channels.

1.31 The present bases of service allocations.

1.311 The Cairo-Atlantic City decisions.

1.312 Regional agreements.

1.313 Special arrangements.

1.314 National arrangements.

1.315 Government - non-government arrangements.

1.316 Administrative agency arrangement.

1.32 Determinants of channel widths.

1.321 Technical.

1.3211 Performance of existing equipment in service.

1.3212 Influence of new equipment not yet in service.

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1.3214 Power requirement.

1.3215 Intelligence bandwidth.

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1.3313 Interference.

## 1.332 International mechanisms.

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1.3322 Regions 1, 2, and 3.

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## 1.333 International procedures.

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1.3333 Derogation.

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1.3411 No use.

1.3412 Standby "use."

1.3413 Idling "use."

1.3414 Scheduled use.

1.3415 Non-productive use.

## 1.342 Utilization of a channel in terms of:

1.3421 Time sharing.

1.3422 Geographical sharing.

1.3423 Appropriateness of band.

1.3424 Unnecessary radiation (interference possibilities).

1.34241 Excessive power.

1.34242 Radiation in unnecessary directions.

## 1.343 Existent regulation and control.

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## 1.41 Treated by the bands shown under 1.25.

## 1.411 Technical betterment of ratio of intelligence units to spectrum units.

1.4111 Transmitter stability (closer tolerance).

1.4112 Minimization of unnecessary sideband frequencies.

1.4113 Improved receiver sensitivity.

1.4114 Improved receiver selectivity.

1.4115 Full application of technical knowledge to design and use of antennas.

1.4116 Better relationship between transmitter power need and present power use.

1.4117 Reduction of man-made and receiver noise.

1.4118 Minimization of spurious and harmonic emissions.

## 1.412 Operational betterment.

1.4121 Minimization of unnecessary transmission.

1.4122 Greater frequency sharing.

1.41221 Time, simultaneous, scheduled, random.

1.41222 Geographical.

1.4123 Minimization of duplicated circuits.

1.4124 Greater use of wire instead of radio.

1.4125 Grading of bandwidths for voice circuits according to needed quality of a service.

1.4126 Reduction of standby circuits, as such.

1.4127 Elimination or reduction of idling.

1.4128 Greater utilization of "optical" bands where these can meet service requirements.

1.4129 More extensive application of propagational data and forecasts.

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1.413 Administrative betterment.

- 1.4131 More rigid and uniform showing of need for a radio channel prior to assignment.
- 1.4132 More rigid and uniform justification of assignment on basis of utilization.
- 1.4133 More rigid and uniform control and regulation of spectrum utilization.
- 1.4134 Evolution, if practical, of formulae for the mathematical expression of need and utilization of spectrum space (both for service allocations and frequencies within the allocations.)
- 1.4135 Establishment of graded penalties for violations of frequency utilization.
- 1.4136 Promotion of operational unification of basic categories of user agencies.
- 1.4137 Closer coordination between all users of frequencies.
- 1.4138 Establishment and enforcement of progressive equipment and operational standards consistent with the advances in research and development.
- 1.4139 Development and execution of long-range plans for spectrum utilization which anticipate advances in research and development.
- 1.4139<sup>1</sup> Projection of U. S. progressive standards into the international scene.
- 1.4139<sup>2</sup> Long range coordinated policy planning, carefully executed in order to insure the closest adherence possible to the policies involved.

1.5 Conclusions and Recommendations.

1.51 Conclusions.

1.52 Recommendations.

- 1.521 Language of long-range proposed national policy.
- 1.522 Proposed ways and means of implementing that policy.
- 1.523 Proposed ways and means of anticipating frequency problems by timely revision of pertinent national policy.



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2. EFFECTIVENESS OF ADMINISTRATION OF THE RADIO SPECTRUM BY THE UNITED STATES

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2.11 Early recognition of need for regulation of radio

2.111 Safety purposes.

2.112 Avoidance of interference.

2.113 National security.

2.114 Standardization of systems.

2.12 The development of order.

2.121 The evolution of the body of radio law.

2.1211 National.

2.1212 International treaty and agreements.

2.122 The evolution of mechanisms to administer the radio law.

2.1221 Civil administration.

2.1222 Governmental.

2.12221 Military.

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2.13 Changes in the application of the radio law to basic categories of users.

2.131 Government vs. non-government.

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2.2 Appraisal of the Effectiveness of Present Administrative Machinery.

2.21 The present machinery.

2.211 The basic organs.

2.2111 FCC

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2.21121 Military.

2.21122 Non-military

2.2113 IRAC

2.2114 Department of State

2.2115 TCC

2.2116 ACC

2.22 Appraisal of effectiveness.

2.221 Centralized authority and responsibility.

2.2211 Status of TCC.

2.2212 Communications Act of 1934 as amended.

2.2213 Congressional authority and responsibility of  
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2.2214 Presidential authority and responsibility for  
Federal communications.

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2.22142 Through various executive departments  
and agencies.

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- 2.222 Formulation and implementation of overall national communications policy.
  - 2.2221 Review of past and present policies and/or positions.
  - 2.2222 Necessity of long range policy.
  - 2.2223 Instabilities resulting when no long range policy guide is available.
- 2.223 Coordination between Organizations.
  - 2.2231 FCC
  - 2.2232 IRAC
  - 2.2233 TCC/ACC
- 2.224 The degree of long-range planning,
  - 2.2241 in the use of advanced techniques;
  - 2.2242 of transitions from peace to war and war to peace;
  - 2.2243 in response to the requirements of existing policy.
- 2.225 Effectiveness in the imposition of performance standards on all users of the radio spectrum.
  - 2.2251 Users regulated by FCC.
  - 2.2252 Federal users.

### 2.3 Objectives for Better Administration.

- 2.31 Continuity of overall administration of the radio spectrum.
- 2.32 Centralization of responsibility for the overall administration of the radio spectrum.
- 2.33 Centralization of authority, commensurate with the responsibility in 2.32, for the overall administration of the radio spectrum.

### 2.4 Functions of Centralized Administration.

- 2.41 Execution of national communication policy with respect to spectrum utilization.

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- 2.42 Formulation of additions to, and amendments of, national communications policy.
- 2.43 Coordination between all radio spectrum user representatives.
- 2.44 Long-range planning for the better utilization of the spectrum.
  - 2.441 Research and development advances.
  - 2.442 Operational technique improvements.
  - 2.443 Transitions from peace to war and war to peace.
- 2.45 Evolution of U.S. positions and proposals for international negotiation.
- 2.46 Establishment and enforcement of overall uniform controls and regulations for the use of the radio spectrum by any user.
- 2.5 Mechanism for Meeting the Objectives.
  - 2.51 Presidential or Congressional?
  - 2.52 To replace, revise, absorb, or override FCC?
  - 2.53 Be concerned only with radio, or all communications?
  - 2.54 Single head or a board?
  - 2.55 Separate law or revision of Communications Act of 1934, as amended, or an Executive Order?
- 2.6 Conclusions and Recommendations.

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3. UN SOUND CONDITIONS IN THE DOMESTIC TELEGRAPH INDUSTRY

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3.11 Description of systems - 1925 to date.

3.111 Western Union.

3.112 Postal.

3.113 AT&T.

3.114 Others.

3.115 Governmental.

3.1151 Military.

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3.12 Trends in public habit in the use of telegram service.

3.13 Competitive trends and parallel operations.

3.131 Within the industry.

3.1311 Inter-city radio.

3.1312 Private leased facilities.

3.1313 Governmental facilities.

3.1314 TWX vs. telegram service.

3.132 Other media.

3.1321 Telephone.

3.1322 Mail.

3.1323 Express service.

3.14 Technological trends.

3.141 Facsimile.

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3.143 Reduction of relaying.

3.144 Collection and distribution facilities.

3.15. Economic trends.

3.151 Labor and the cost of labor.

3.152 Rates.

3.153 Non-profit operations.

3.154 Ancillary services.

3.155 Taxation - city, state, and federal.

3.156 Earnings performance.

3.2 An Evaluation of the Industry in Terms of the National Interest.

3.21 National security.

3.211 Provision of domestic network for military operations.

3.212 Provision of domestic network for civil operations which support military operations.

3.213 Source of trained communication personnel for military service.

3.214 Source of equipment and facilities for military use.

3.215 Medium for keeping public informed including the press.

3.22 National economy.

3.221 National telegraph industry product in dollars per annum.

3.222 Number gainfully employed.

3.223 Acceleration of economic activity.

3.224 Collection and distribution system for overseas telegrams.

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3.3 Evaluation of the Western Union Situation in terms of the National Interest.

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3.3121 Speed of service.

3.3122 Accuracy and certainty of service.

3.3123 Number of offices.

3.313 Effects of rate increases upon volume of traffic and profits.-

3.314 Managerial response to utilization of the products of research and development in terms of economic practicability.

3.315 Effects of leasing facilities.

3.316 Long range planning.

3.4 Evaluation of Possible Corrective Measures.

3.41 Government action.

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3.413 Diversion of Government traffic to Western Union.

3.414 Require by law sale of TWX service to Western Union.

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4.111 Extent and Limitation of responsibility and authority.

4.112 Wire Service.

4.12 Fields of authority and responsibility.

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4.123 Radio equipment and radio operators on board ship.

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4.322 The kinds of rule-making.

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- 4.329 Anticipated rule-making work load.
- 4.33 Enforcement.
  - 4.331 The purpose of enforcement.
  - 4.332 The means of detecting violations.
  - 4.333 Enforcement processes.
    - 4.3331 Simple citations.
    - 4.3332 Involved violations.
    - 4.3333 Imposition of penalties.
  - 4.334 The relationship of enforcement to authorizations and rule-making.
  - 4.335 Current backlog of enforcement work load.
  - 4.336 Anticipated enforcement work load.
- 4.34 Hearings.
  - 4.341 The cause of hearings.
  - 4.342 The purpose of hearings.
  - 4.343 The relationship of hearings to rule-making.
  - 4.344 The hearing processes.
    - 4.3441 Hearings before Commission.
    - 4.3442 Hearings before Examiners.
  - 4.345 Current backlog of hearing schedules in terms of numbers and age.

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- 3.346 Anticipated hearing work load.
- 4.35 Inspection.
  - 4.351 The purpose of inspection.
  - 4.352 The scope of inspection.
  - 4.353 The organization for inspection.
  - 4.354 Current inspection work load.
  - 4.355 Anticipated inspection work load.
- 4.36 Monitoring.
  - 4.361 The purpose of monitoring.
  - 4.362 The scope of monitoring.
  - 4.363 The organization for monitoring.
  - 4.364 Status of current monitoring work load.
  - 4.365 Anticipated monitoring work load.
- 4.37 Special legal activities.
  - 4.371 Litigation.
  - 4.372 Congressional legislation.
  - 4.373 Testimony and statements for Congress and other Federal agencies.
  - 4.374 Recommendations to Congress for modification of the Act.
  - 4.375 Status of current work load.
  - 4.376 Anticipated work load.
- 4.38 Preparation for and participation in international communications conferences.
  - 4.381 Purpose of activity.
  - 4.382 Scope of this activity.
  - 4.383 Current work load.
  - 4.384 Anticipated work load.

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4.39 General administration.

4.391 Offices of the Commissioners.

4.392 Personnel.

4.393 Executive management.

4.394 Budget and finance.

4.395 Planning.

4.396 Other.

4.397 Status of present work load.

4.398 Anticipated work load.

4.39<sup>1</sup> Policy making.

4.39<sup>1</sup><sub>1</sub> The purpose of policy making.

4.39<sup>1</sup><sub>2</sub> The scope of policy making.

4.39<sup>1</sup><sub>21</sub> Internal application.

4.39<sup>1</sup><sub>22</sub> External application.

4.39<sup>1</sup><sub>3</sub> Status of current policy making.

4.39<sup>1</sup><sub>4</sub> Anticipated policy making work load.

4.39<sup>2</sup> Summary of current and anticipated work loads.

4.4 Additional Factors Contributing to the Problem.

4.41 Effect of economy-mindedness upon Commission appropriations.

4.42 The effects of the staff-work load ratio upon efficiency.

4.43 Requirements of new services and activities.

4.431 Color television.

4.432 Land mobile services.

4.433 Rapid technological advances.

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4.44 Requirements of Government.

4.441 Congressional investigations of FCC.

4.442 Korean situation and military needs.

4.443 The Atlantic City Table of Frequency Allocations.

4.444 The President's Communications Policy Board.

4.445 Man-hours required in the reorganization survey.

4.45 The effects of reorganization.

*Evaluation of*

4.5 Recommended Measures for Improvement.

4.51 Administrative.

4.511 Steamline operations.

4.512 Greater delegation of authority to Staff.

4.513 Reduction of Commissioners' detailed work load.

4.514 Bring rules and regulations up to date and maintain their currentness.

4.515 Impose small penalties for minor violations to reduce work load.

4.516 Minimize, as far as practicable, legalistic approach to administration.

4.517 Continue to review the Act from the point of view of simplifying administration.

4.518 Consider the merits of including a general manager on the Commission with a view to relieving the Commissioners of administrative problems.

4.52 Personnel.

4.521 Improve calibre of executive and administrative talent.

4.522 Establish training program for Staff.

4.523 Keep key members of Staff informed of technological progress of the communications arts and sciences.

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4.524 Endeavor to transfer personnel to positions best suited to their ability.

4.525 Balance number of top ratings in relation to size of Staff.

4.526 Possibility of obtaining hiring and firing authority.

4.53 Budgetary.

4.531 Necessity for convincing presentation of budgetary requirements.

4.54 Policy determinations.

4.541 Emphasize service to the public (not regulation of the public).

4.542 Necessity of keeping Staff and public advised concerning policy.

4.543 Necessity for determining overriding policy at Commission level.

4.55 Organization of FCC.

4.551 Panelization of Commissioners by basic fields of activity.

4.552 Functionalize Staff completely.

4.553 Extreme desirability of maintaining professional balance in the appointment of Commissioners (lawyers, engineers, business men, public affairs men, economists, and communicators).

4.6 Conclusions.



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5. THE NECESSITY FOR FORMULATING AND IMPLEMENTING A NATIONAL TELECOMMUNICATIONS POLICY.

5.1 Introduction.

5.11 A definition of policy.

Policy is an expression of a course of conduct, specifically a line of governing action with respect to some specific issue.

A well-rounded policy should be declaratory, informative, objective, developmental, coordinative, and continuing; it should implement and preserve the national ideals in a desirable course of action.

Note: A "position" is not to be confused with a policy in this paper, as a "position" is considered to be a stand determined by policy.

5.12 The purpose of national telecommunications policy:

The purpose of national telecommunications policy is to guide the Nation in the best possible development and application of telecommunications.

5.2 Past Performance of the U. S. in the Formulation and Implementation of National Communications Policy.

5.21 During the growth of telecommunications over the years, the United States, in its increasing need for the rapid exchange of ideas, has evolved a number of positions and in some cases policies, which have served to some extent as guide posts for the regulation of telecommunications nationally and internationally.

These policies and positions for the most part exist only in the minds of those who use them, or are embraced *within* with the necessarily broad language of international communications treaties, or are in some regulatory outlines of particular agencies, etc.

So far as is known, these "guide posts" have never been set forth in any one document, properly evaluated, translated in terms of the national interest, and made available for the guidance and coordination of the telecommunications interests of the United States.

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## 5.22 Paraphrases of certain policies and positions.

5.221 General Telecommunications.

5.2211 That, it shall be the aim and goal of the United States to adequately provide for the rapid unrestricted exchange of international and national telecommunications, consistent with national security.

(Ref: Atlantic City Convention, Art. 28 and 33.)

5.2212 That, it shall be the constant aim of the United States to strive for world leadership in the advancement technically, scientifically, procedurally, and operationally of the telecommunications art, with the limitations imposed by economic practicability.

(Ref: Accepted practice.)

5.2213 That, the United States does foster and encourage the participation of private United States communications enterprises in the work preparatory to and of telecommunication conferences which involve the interests of the United States.

(Ref: Annex 4, General Regulations, Atlantic City, Chapter 2.)

5.2214 That, in time of war, national emergency, or limited national emergency, as proclaimed by the President, the U. S. Government shall have available to it the total telecommunication resources of the United States, with due regard to the extent of the war or emergency and the continuing operation of services considered to be essential or desirable to the welfare of the United States during such a time.

(Ref: E. O. #8546, DCB.)

5.2215 That, the United States should be appropriately represented at any telecommunications conference when such a conference is considered to be related, directly or indirectly, to the national interest.

(Ref: Accepted practice.)

5.2216 That, the United States continually strive to make available, as far as possible, to all the people of the United States, for the purpose of National Defense, stimulating Interstate and

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Foreign Commerce, and for the purpose of promoting safety of life and property, a rapid, efficient, nation-wide and world-wide wire and radio communication service with adequate facilities at reasonable charge.

(Ref: Sec. 1, Communications Act of 1934.)

5.222 Radio Communications.

5.2221 That the United States considers that the basic guide to follow in the normal assignment of radio frequencies for transmission purposes is the avoidance of harmful interference.  
(Ref: Atlantic City Convention, Art. 3 and 44.)

5.2222 That the United States considers that, in the normal peace-time assignment of radio frequencies, the highest priority of assignment is as follows in the order named:

- (1) Frequencies used predominantly, primarily, and directly to safeguard the national security, which means that such frequencies carry intelligence of the highest order which is vital to the safety of the nation.
- (2) Frequencies used primarily, predominantly, and directly to safeguard life and property in conditions of distress.
- (3) Frequencies used in services where no other adequate means of rapid communication exists and where such communication is considered to be necessary or desirable in the national security or interest.
- (4) Frequencies used for all other purposes, the assignment of which must necessarily be judged upon the merits of individual need.  
(Ref: Accepted practice.)

5.2223 That the United States considers, in the peace-time assignment of radio frequencies for communications purposes, that such frequencies should not normally be assigned when other forms of communication, notably wire communication, will suffice.  
(Ref: IRAC policy.)

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- 5.2224 To make the most efficient and orderly use of the radio spectrum in the national interest Administration of the radio spectrum must be predicated on consideration of all available data, including justification, international regulations, national laws, established government policies, national interest, availability of other possible communication facilities, and technical aspects.  
(Ref: IRAC report to Sadowski, page 4. Library Ref. CA 28.)
- 5.2225 To the end that there be most efficient utilization of the radio spectrum, acceptance of a radio frequency assignment imposes definite obligations on the assignee with respect both as to equipment and to use. Some of these are specified in treaties and laws. Among the important obligations are:
- (a) To use the best and most selective radio apparatus the state of the art and service operating requirements permit;
  - (b) To use frequencies economically by avoiding unnecessary omissions and conducting operations on a minimum number of frequencies;
  - (c) To share frequencies between agencies as a recognized and necessary expedient for the fullest utilization of the radio spectrum.  
(Ref: IRAC report to Sadowski, page 4, Library Ref. CA 28.)
- 5.2226 That the United States insists, as a basic policy, upon the planned use of the radio spectrum.  
(Ref: Instructions to Chairman, U.S. Delegation to the High Frequency Broadcasting Conference, Mexico City, 1948, TCC Document #405, Annex 2. Library Ref. C59.)
- 5.2227 That the United States recognizes the necessity for both simultaneous and non-simultaneous sharing of frequencies on both a national and an international basis.  
(Ref. TCC Document 243, page 2. Library Ref. C41.)

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PROBLEM 155.223 Cable Communications.

5.2231 That the United States fosters and promotes research and development in both cable and radio communication. The use of improvements such as submarine repeaters and multi-channel operation shall, wherever possible, be encouraged. (Ref: Bermuda Agreement, TD Serial #558, Final Acts, page 10, Library Ref. C90.)

5.224 Wire Communications.

5.2241 That the United States considers the wire communication networks in the continental United States and its possessions to be vitally necessary to the national security and interest, both from a standpoint of rapid internal communication and the expeditious exchange of international communication, and that as such, these wire communication networks should be based upon the soundest structure possible and should reflect the most efficient and modern operation that sound economics will permit. (Ref: Accepted practice.)

5.225 Broadcast Communications.

5.2251 That the United States is strongly opposed to the principle of priority categories of broadcasting service as a basis of frequency assignment. (Ref: TCC Doc. 405, Annex 2, Library Ref. C59.)

5.2252 In the interests of international understanding and the promotion of peace and harmony among the nations of the world, a high premium must be placed upon the high frequencies for international broadcasting. (Ref: TCC Doc. 405, Annex 2, Library Ref. C59.)

5.226 Aeronautical Communications.

5.2261 That the United States subscribes to the view that no public correspondence shall be transmitted on aeronautical mobile frequencies. (Ref: TPS Doc. Serial #569, page 17, Library Ref. C94.)

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5.227 Marine Communications.

5.2271 That the United States favors the establishment of a system of radio communication between aircraft and the Maritime Mobile Service, which enhances safety and provides a means for the handling of traffic with aircraft on a world-wide basis.

(Ref: TD Doc #16, Serial #341, page 83, para. D, Library Ref. C83.)

5.228 Amateur Communications.

5.2281 That the United States considers the Amateur Service to be vitally necessary to the national security and interest in providing a pool of self trained personnel in the techniques of telecommunications, inter-communication, skilled operators and radio frequencies which are of value in limited or national emergency.

(Ref: Accepted practice.)

5.229 Telegraph Communications.

5.2291 That the United States subscribes to the standardization of the 5-unit code of International Telegraph Alphabet number two.

(Ref: TPS Doc. #563, page 16, Library Ref. C92.)

5.2292 That the United States advocates the elimination of special rates for Government telegrams in the International Service.

(Ref: TPS Doc. Serial #563, page 32, Library Ref. C92.)

5.229<sup>1</sup> Navigational Aids.

5.229<sup>1</sup><sub>1</sub> Aeronautical

"UNITED STATES NATIONAL POLICY ON ELECTRONIC  
LONG-DISTANCE AIDS TO NAVIGATION

POLICY

"1. The policy of the United States in respect to electronic long-distance aids to navigation is as follows:

"a. The United States will support and promote a single system of electronic long-distance aids to navigation for United States and world-wide standardization.

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"b. At the present time the aids which the United States has adopted and now supports and promotes are Loran and high-power LF/MF Non-Directional Beacons in that order of preference.

"(1) 'Loran' is considered as one type of aid regardless of the frequency employed.

"(2) Loran will be continued, improved, and expanded to provide needed coverage. The choice of a frequency for Loran installations in any particular area will be governed by the requirements to be met and the frequencies available in that area.

"(3) Wherever it is technically, economically or operationally desirable, the United States supports LF/MF Non-Directional Beacons of sufficient power to meet requirements in a specific area.

"(4) Recognizing the special recommendations set forth in Attachment A of the draft document, 'Annex 10 to the Convention of International Civil Aviation', during the interim period the continued use or extension of other systems will not be acceptable if such system or systems require airborne or shipborne equipment in excess of, or different from, that required for the use of Loran or LF/MF Non-Directional Beacons.

"c. The United States will take the necessary steps to obtain and maintain at all times the qualitative and quantitative data by which the choice of electronic long distance aids to navigation can be determined and furthered internationally."

(Ref: TCC Doc. #557, Appendix A, Library Ref. RG15.)

#### 5.229<sup>1</sup>2 Maritime

#### "UNITED STATES POLICY FOR RADIO AND ELECTRONIC AIDS FOR MARINE NAVIGATION"

"The national security, the nation's sea commerce, and the assurance of adequate safety of life and property at sea require an efficient, integrated, standardized system of radio and electronic aids for marine navigation.

"A multiplicity of new radio and electronic devices and systems possessing potential applicability for marine navigation have been developed during recent years, both at home and abroad. In fact, the devices and systems which have been developed and made potentially available as aids to navigation are so numerous that standardization is mandatory if the encouragement and development of United States sea commerce is to take place economically and realistically.

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"In consequence, it is vital to the national interest that the United States play a leading role in the development, investigation, selection and standardization of a world-wide system for marine navigation. This role should be played at the earliest practicable moment consistent with open-mindedness and sound technical judgment directed toward the attainment of optimum results, with due consideration for the cost to ship operators being kept as low as practicable.

"An open-minded attitude shall be maintained toward novel systems and devices which eventually may develop to be superior to existing systems. This attitude, however, shall not be permitted to retard the adoption of a world system based on systems already proved and in wide use over a large part of the world's waterways.

"To simplify standardization, to effect the greatest economy in operation and to further the most economical use of the radio spectrum, the joint use of radio aids by both air and sea craft is hereby advocated where mutually advantageous.

"The policy contained herein is applicable for domestic guidance as well as for use as a basis for international discussions on standardization of devices, systems and performance.

"For the present and at least the immediate future the following devices and systems are advocated as being practicable.

"I. Navigation

"A. Anti-Collision.

The use of radar shall be encouraged in order to enhance safe and economical operation primarily to reduce the risk of collision.

"B. Position Fixing.

1. Distances over fifty miles.

(Aid to ocean navigation requiring accuracy of 1% and allowing 15 minutes to obtain position fix.)

(a) Loran - This system shall be continued, improved and expanded.

(b) Shipboard MF/DF with radio beacons (useful up to 200 miles). This system shall be continued, improved and expanded.



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"2. Distances between 50 and 3 miles.

(Aid to approaching land, coastal navigation and port approach requiring one-half mile to 200 yards accuracy and allowing 5 minutes to one-half minute respectively to obtain position fix.)

- (a) Shipboard MF/DF with radiobeacons. This system shall be continued, improved and expanded.
- (b) Shipboard radars. Their use shall be encouraged and the devices shall be improved.
- (c) Radar aids, both active and passive. They are necessary for the special marking of navigational aids, dangers and shore features, to facilitate identification by radar. Their further development for purposes of operational evaluation should be continued.

"3. Distances less than 3 miles.

(Aid to harbor entrance requiring 50 yards accuracy and instantaneous position and track fixing.)

- (a) Shipboard radars (high resolution). Their use should be encouraged and the devices shall be improved.
- (b) Radar aids, both active and passive. They are necessary for the special marking of navigational aids, dangers and shore features, to facilitate identification by radar. Their further development for purposes of operational evaluation should be continued.
- (c) Shipboard MF/DF with radiobeacons. This system shall be continued, improved and expanded.

"II. Harbor Control and Harbor Communication.

A. Harbor Control Radar.

This service shall be provided as required.

B. Harbor Control Communications.

VHF Radiotelephone channels for harbor control purposes shall be provided. The channels and modulation should be standardized internationally.

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"III. Frequencies.

"The United States shall advocate the international standardization of frequency allocations for use or operational evaluation with respect to the above devices and systems.

"It is believed that the frequency allocations recommended to the Department of State by the Interdepartmental Radio Advisory Committee and the Federal Communications Commission will meet the operational and technical requirements of the radio navigational devices and systems herein designated. These are as follows:

" A. Shipboard Radar:	3000 to 3246 Mc
	5460 to 5650 Mc
	9320 to 9500 Mc
" B. Radar Beacons:	3256 Mcs $\pm$ 10 Mc
	5450 Mcs $\pm$ 10 Mc
	9310 Mcs $\pm$ 10 Mc
" C. Loran:	1800 to 2000 kc
" D. LF/MF Radiobeacons	280 to 320 kc
" E. Harbor Control Communications in the Band:	152 to 162 Mc."

(Ref: IMRAN Doc. 5, Library Ref. C98.)

5.3 Some Additional Telecommunications Problems Which Require National Policy.

- 5.31 Necessity of agreed technical standards for national application by the various services using radio frequencies.
- 5.32 Growing demand for radio frequencies and the need for a governing policy.
- 5.33 Necessity for policy to insure an adequate and sound domestic wire distribution service.
- 5.34 Necessity for policies designed to insure proper and adequate functioning of such regulatory or advisory bodies as FCC, TCC, and IRAC.

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- 5.35 Necessity for policies designed to serve the national interest and security from the standpoint of merging communication interests.
- 5.36 Necessity for policy to govern and decide the extent to which government should operate communication facilities under our system of free enterprise.
- 5.37 Necessity for policy to dictate the degree of monopoly in telecommunications which is considered to be in the best interest of the United States.
- 5.38 Necessity for a policy governing the transition and the extent of transition of communication facilities from a war footing to a peace footing.
- 5.39 Necessity for a policy to indicate the United States needs in the radio spectrum with relation to the rest of the world.
- 5.39<sup>1</sup> Necessity for a policy governing the use of cables in relation to the use of radio.
- 5.39<sup>2</sup> Necessity for a basic policy which recognizes the need for and application of a Federal mechanism for the overall planning, coordination, promotion, control, regulation, and administration of all U.S. communication services.
- 5.39<sup>3</sup> Necessity for a policy governing the following services:
  - 5.39<sup>31</sup> Tropical broadcasting.
  - 5.39<sup>32</sup> High frequency broadcasting.
  - 5.39<sup>33</sup> Telephone communication.
- 5.39<sup>4</sup> Necessity for a policy governing the allocation of frequency bands to formalized radio services.
- 5.39<sup>5</sup> Policy regarding amateurs.
- 5.39<sup>6</sup> Necessity for a policy which will clarify governmental and non-governmental use of the spectrum by the United States.
- 5.39<sup>7</sup> Necessity for a policy concerning coordination between the International Telecommunications Union, International Meteorological Organization, the proposed Inter-governmental Maritime Consultative Organization, and the International Civil Aviation Organization so far as telecommunications matters are concerned.

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5.4 References Through Which National Telecommunication Policy May Be Found.

- 5.41 Review of United States Chairmen Reports on international telecommunications conferences.
- 5.42 Review of instructions to delegations to and proposals for international conferences.
- 5.43 Review of TCC decisions.
- 5.44 Review of all bi-lateral and multilateral telecommunication conference agreements, treaties, and final acts.
- 5.45 Other related documents, such as the Communications Act of 1934, The Radio Law, etc.

5.5 The Need For An Overall National Telecommunications Policy.

- 5.51 The difficulty of reaching decisions and solving problems in the absence of a stated policy.
- 5.52 The difficulty of determining delegation positions at international conferences because of the necessity of searching through past documentation of preceding committees or conferences.
- 5.53 The desirability of having stated telecommunications policy available in one brochure for reference by all services.

5.6 Existing Mechanism for the Formulation and Implementation of National Communications Policy.

- 5.61 Graphic representation of Constitution, President, Congress, Department of State, TCC, FCC, and any other related bodies which presently administer or implement telecommunications policy.
- 5.62 Review of past formulation and implementation of policy by the present mechanism in order to determine whether it has been sufficiently effective.
- 5.63 Comparative review of the effectiveness of other national mechanisms.

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5.7 The Necessity for an Overall Mechanism to Administer National Communications Policy.

5.71 An estimate of the future need for overall administration of national communications policy based upon the growth of telecommunications, nationally and internationally.

5.72 The undesirable existing situation which obtains with regard to policy in the telecommunications field.

5.8 Conclusions and Recommendations.

5.81 Summarization of the problem and its relationship to the remainder of the items in this outline.

5.82 Recommendations for new or revised policies, if any.

5.83 Recommendations for new or revised mechanisms to implement or administer such policies.

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6. MERGER OF COMMERCIAL OVERSEAS COMMUNICATIONS COMPANIES IN TERMS OF OVERALL NATIONAL INTEREST.

6.1 Introductory - Description of the United States Commercial Overseas Communications Facilities.

6.11 Physical plant.

6.111 Cable.

6.112 Radiotelephone.

6.1121 Fixed services.

6.1122 Maritime services.

6.113 Radiotelegraph.

6.1131 Fixed services.

6.1132 Maritime services.

6.12 Magnitude of traffic handled.

6.121 Cable

6.122 Radiotelephone.

6.123 Radiotelegraph.

6.13 Magnitude of revenues and earnings.

6.131 Cable

6.132 Radiotelephone.

6.133 Radiotelegraph.

6.14 Radio spectrum utilization.

6.141 Frequency use.

6.142 Extent of duplication.

6.15 Relationship of these commercial facilities to overseas governmental facilities.

6.151 Degree of availability of commercial facilities to meet governmental communications needs.

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- 6.1511 Military
- 6.1512 Non-military.
- 6.152 Extent of governmental facilities.
  - 6.1521 Circuit duplications.
- 6.153 Effect of governmental facilities upon commercial revenues.
  - 6.1531 Military.
  - 6.1532 Non-military.
- 6.154 Government rate differentials.
- 6.16 Value of commercial overseas facilities to the national interest.
  - 6.161 National security.
    - 6.1611 Military economy and wartime readiness during peacetime.
    - 6.1612 Military use in wartime.
  - 6.162 National economy.
    - 6.1621 Facilitation of international trade and understanding.
    - 6.1622 Gainful employment.
- 6.2 Merger Possibilities.
  - 6.21 Elemental combinations.
    - 6.211 All fixed and maritime commercial radiotelegraph services.
    - 6.212 All fixed and maritime commercial radiotelephone services.
    - 6.213 Combinations of 6.211 and 6.212.
    - 6.214 All commercial overseas facilities.
    - 6.215 Government overseas facilities.

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6.216 MRT, RCAC, and WU.

6.217 All overseas facilities.

6.22 Advantages and disadvantages of each combination under 6.21  
in terms of:

6.221 National security;

6.222 Foreign policy;

6.223 Bargaining Power with relation to Foreign Administrations.

6.224 Health of the overseas communications services;

6.225 National economy;

6.2251 Effect on rates.

6.2252 Effect on frequency requirements.

6.2253 Effect on speed of service.

6.2254 Effect on overhead expenses.

6.2255 Universal standards of operation.

6.3 Problems Incident to Effecting Merger.

6.31 Legal.

6.311 Anti-trust laws.

6.312 Enabling legislation.

6.3121 Mandatory.

6.3122 Voluntary.

6.313 Patent matters.

6.314 Contractual commitments.

6.32 Financial.

6.321 Valuation of plant.

6.322 Liquidation or transfer of financial obligations.



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- 6.323 Writing-off or disposing of surplus or obsolescent plant.
- 6.33 Labor relations.
  - 6.331 Labor contracts.
  - 6.332 Level of employment.
- 6.34 Technical.
  - 6.341 Compatibility of techniques.
    - 6.3411 National.
    - 6.3412 International.
- 6.35 Operational.
  - 6.351 Standardization of procedures and practices.
    - 6.3511 Domestic.
    - 6.3512 Foreign.
  - 6.352 Standardization of teletypewriter keyboards.
- 6.36 Political.
  - 6.361 Commercial sentiment.
  - 6.362 Government sentiment.
  - 6.363 International sentiment.
- 6.4 Effects of Merger Upon the National Interest.
  - 6.41 National security.
    - 6.411 Capacity of merged systems to provide for military needs.
    - 6.412 Reduction of number of negotiators for war and peace planning.
    - 6.413 Protection of facilities through dispersion.
    - 6.414 Necessity of a stabilized existence of an overseas system for war purposes.

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6.415 Possibility of ratifying the International Telegraph Regulations under some form of merger.

6.42 National economy.

6.421 Effects on labor.

6.422 Effects on rates.

6.423 Effects of loss of competition.

6.424 Effect on progressiveness of management.

6.425 Effects on negotiations.

6.426 Effects on quality and speed of service.

6.427 Effects on frequency utilization.

6.5 Conclusions and Recommendations.

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PROBLEM #7

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7. THE EXTENT TO WHICH THE FEDERAL GOVERNMENT SHOULD CONTINUE OPERATION OF COMMUNICATION FACILITIES

7.1 The Growth and Development of Federal Communication Facilities.

7.11 Factors which led to development of government facilities.

7.111 Military need for adequate communications.

7.112 Need for rapid communication for Federal agencies.

7.113 Safety services.

7.114 Public correspondence in Alaska, military bases and occupied areas.

7.12 Effect of World War II.

7.121 Military occupational requirements.

7.122 Overseas U. S. political interests.

7.123 Rapid expansion of aeronautical transportation services.

7.124 International broadcasting.

7.2 Existing Federal Government Facilities, Magnitude and Traffic, Last Representative Year.

7.21 Wire and cable facilities, leased and owned outright, telegraph.

7.211 Military.

7.212 Non-military.

7.22 Wire facilities, leased and owned outright, telephone.

7.221 Military.

7.222 Non-military.

7.23 Radio telephone facilities, leased and owned outright.

7.231 Military.

7.232 Non-military.

7.24 Radio telegraph facilities, leased and owned outright.

7.241 Military.

7.242 Non-military.

7.25 Other services maintained by Federal agencies,

7.251 Safety.

7.252 Navigational.

7.253 Aeronautical.

7.3 Extent and Cost of Operating These Facilities, Broken Down By Classes of Operation and Agency.

7.31 Evaluation of the need for these services in terms of duplication and necessity.

7.311 Contribution of these services to the national interest.

7.312 Degree of standardization.

7.4 Justification of Government Operation Where Commercial Facilities Are Available.

7.41 Comparative costs broken down by services and agencies.

7.42 Effects upon stability of commercial operations.

7.43 Effects upon utilization of radio spectrum.

7.44 Study of special services and areas.

7.441 High frequency broadcasting.

7.442 Alaska, Puerto Rico, Hawaii, Canal Zone.

7.45 Quality of service.

7.451 Federal operation.

7.452 Commercial operation.

7.46 Incidental costs of government and commercial operation.

7.461 Government administrative costs.

7.462 Commercial billing costs.

7.463 Claims.

7.464 Tax differential.

7.465 Effect of government operation on public rates.

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7.5 Conclusions and Recommendations.

7.51 Review of Federal Government operation in services where commercial service is available.

7.512 Review of Federal Government operation in services where no commercial service is available.

7.52 Conclusions.

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8. A REVIEW OF UNITED STATES TELECOMMUNICATIONS FROM THE STANDPOINT OF MONOPOLY.

8.1 Introductory - Extent of Communication Activities Under Consideration.

8.11 Governmental systems.

8.111 Alaska Communication System (Army Signal Corps).

8.12 AT&T and affiliated companies.

8.121 Domestic telephony.

8.122 Domestic telegraphy.

8.123 Overseas point-to-point radiotelephony.

8.124 High seas radiotelephony.

8.125 Coastal harbor radiotelephone service (2 Mc).

8.126 Port radiotelephone service (VHF).

8.127 Domestic public land mobile radiotelephone service (VHF).

8.13 Western Union Telegraph Company.

8.131 Domestic telephony.

8.132 Domestic telegraphy.

8.14 Mutual Telephone Company of Hawaii.

8.2 Analysis of Factors Which May Indicate Tendencies Toward Monopoly.

8.21 Percentage of total industry activity handled by these activities for past 20 years.

8.211 Dollar revenue.

8.212 Traffic load.

8.213 Exclusivity of areas.

8.22 Willingness to provide interconnecting service to competitors.

8.23 Presence of effective competitive services.

8.24 Price control.

8.25 Progressiveness.

8.3 The Advantages and Disadvantages of Monopoly in the Field of Communications.

8.31 Advantages.

8.311 Integration of system.

8.312 Avoidance of destructive competition.

8.313 Avoidance of duplication of investment in facilities.

8.314 Avoidance of wasteful consumption of natural resources.

8.315 Minimizes coordinative effort.

8.316 Better service resulting from standardized equipment.

8.32 Disadvantages.

8.321 Tendency toward price control.

8.322 Possibility of affording inferior service to public.

8.323 Greater possibility of lack of progressiveness.

8.324 Lack of dispersion in the interest of security.

8.325 Tendency to stifle free competition.

8.4 The Applicability of the Anti-Trust Laws to the Communications Industry.

8.41 Federal.

8.42 State.

8.5 Conclusions and Recommendations.